

## USER CONTROLLED HOME LOCATION REGISTER

## Background of the Invention

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The present invention pertains to communication system subscriber services and more particularly to maintenance and storage of subscriber (user) service profiles.

10 In existing cellular communications systems, user service profiles and subscription restriction agreements are currently stored in a centralized home location register (HLR). The HLR is typically a large database which is owned and configured by the network  
15 operator, the local telephone company. User service profiles include the kinds of services to which a user subscribes, for example, call waiting, call forwarding and three-way calling, etc. Subscription restriction agreements include those which govern functions such as  
20 roaming with a cellular phone. All such user information is commonly stored in a HLR which is maintained and configured by a telephone company.

Changes to the user's service profile are administered by the telephone company which provides  
25 the operation support system (OSS). Typically the HLR is a single function within each Public Land Mobile Network (PLMN). In order to affect changes the user must submit a service change request for either roaming services or basic subscription services or both. The  
30 restriction agreements governing roaming functions and others may be distributed among other HLRs in other Public Land Mobile Networks (PLMN) based on the service level agreement between the various telephone operations companies. The service level agreements  
35 allow each telephone operating company to generate revenue based on subscribers from foreign PLMNs who

roam into their particular PLMN. Changes to restriction agreement must be administered by an operator of the OSS.

As a result, any changes to a subscriber's HLR entry is difficult to change. It may require operator interface to affect the change. Several HLRs may have to be contacted to retrieve and/or modify appropriate service level agreement information. Furthermore, it may take substantial time to update the database of the particular HLR which is associated with the operation support system.

Therefore, it would be advantageous to provide the user or subscriber who desires to modify his restrictive agreements or service profiles or to initiate new services the capability to do so without complex interaction with the telephone company and affect such changes rapidly.

#### Brief Description of the Drawing

The single sheet of drawings included herewith is a block diagram of a user interaction with a distributed home location register arrangement in accordance with the present invention.

#### Description of the Preferred Embodiment

The single drawing sheet depicts a block diagram of a distributed or personal home location register arrangement. Instead of a common home location register (HLR) located in the telephone network system, each subscriber (user) 1 through N would have his or her own personal HLR 10-20. Personal HLRs 10-20 may include a home computer or other intelligent computing device connected to the internet. Each subscriber 1-N maintains his or her personal HLR via interface 2-9.

For example, subscriber 1 will input through interface 2 the new features or changed service level agreements which he wishes to have into his personal HLR 10.

Personal HLR 10 then communicates with the  
5 operations support system (OSS) 30 of a  
telecommunication(s) service provider (telephone  
company) and transmits the feature or roaming changes  
required via link 31. Link 31 may be an internet link,  
wireless link or wire line interface. OSS 30 will then  
10 request roaming policies 40 or subscription information  
regarding feature changes 50. OSS 30 will perform the  
appropriate interfacing for billing associated with  
each of the feature changes and pass the provisioning  
information to personal HLR 10 via link 32. Link 32  
15 may also be an internet link, wireless link or wire  
line interface. In addition, OSS 30 also changes the  
network HLR 70 for subscriber 1 such that the network  
HLR points to the personal HLR 10 for subscriber 1. As  
a result, when requests for features are made of the  
20 network HLR, the network HLR 70 will point to the  
personal HLR 10 which will contain the appropriate  
modified up-to-the-minute subscription and roaming  
information for subscriber 1.

OSS 30 may also receive service level agreement  
25 information from other PLMNs 60. Similarly, subscriber  
N will input changes through interface 9 to his  
personal HLR 20, for example, personal HLR 20 then  
passes on the changes to OSS 30 via link 33.  
Similarly, link 39 maybe an internet link, wireless  
30 link or wire line interface. OSS 30 then obtains  
current roaming policies 40 and subscription  
information 50 concerning whether the subscriber N has  
call waiting, call forwarding or other telephonic  
features. OSS 30 then transmits the authorized changes  
35 via link 33 to personal HLR 20. In addition, OSS 30

set the network HLR 70 for subscriber N to point to personal HLR 20.

In an alternate embodiment, some measure or possibly all the service content, provisioning  
5 information and roaming information may be stored on the personal HLR. New services can be downloaded from a source as the internet of the telephone system to the home computer by the subscriber without the need to configure the network to support these services. For  
10 example, a subscriber may wish to download a new service to their home computer that is not offered by the telephone company. The mobile subscriber could then execute the service from their mobile handset with their home computer acting as an external feature  
15 server to the network. Additionally, these subscriber specific services could be supported by an external feature server, with personal HLR containing a pointer to this external feature server.

As can be seen from the above explanation, this  
20 arrangement eliminates the need for the subscriber to request all changes through the telephone company's operator. This arrangement also allows subscription restrictions to be determined on a per feature basis. For example, a subscriber may wish to enable nationwide  
25 roaming prior to a business trip. The subscriber could modify the restriction in his personal HLR without operator intervention.

In another embodiment, this arrangement allocates the personal HLR to the feature service provider. In  
30 this instantiation of the invention, the feature's specific provisioning information typically stored in the HLR is now distributed to the HLR function associated with the feature service provider. Consequently, the network service provider HLR merely  
35 points to the feature service provider's HLR. Some or possibly all service content, provisioning information

and roaming information which is required to operate this particular feature is stored on the feature service provider's HLR. The feature service provider may provision an act of a new service without the need  
5 to configure the network to support these services. As an example of roaming restrictions, a subscriber can now modify the restrictions on a per feature basis without impacting the network's HLR.

The distribution of the HLR function as described  
10 above provides the capability for a subscriber to directly modify restrictions, service profiles and agreements, and invoke new services without the intervention of an operator of the telephone company.

This invention can be added into existing networks  
15 through the use of network HLR 70. Since network HLR 70 routes all requests for a subscriber to their personal HLR (10-20), requests from foreign networks that have not implemented personal HLRs can be accommodated. Also, a PLMN can deploy both personal HLRs for some  
20 subscribers and network HLRs which use the traditional subscription management method for other subscribers, allowing for an orderly migration plan. This is termed a mixed mode deployment method.

This invention also supports new service models  
25 for network operators. For instance, the mixed mode deployment method provides the opportunity for a multi-tiered service model where subscribers who pay a higher rate are allowed greater service flexibility through the use of the Personal HLR while other subscribers who  
30 pay a lower rate use the traditional method (the network HLR). Another instance is a push-based service where the subscriber pays a fee to have services pushed to the Personal HLR. For example, there could be an entertainment service which pushes different media  
35 services (music, articles, video clips) to the subscriber daily.

1. *Phragmites australis* (Cav.) Trin. ex Steud.  
 2. *Scirpus americanus* (L.) Pers.  
 3. *Eleocharis acicularis* (L.) Rostk Schmidt  
 4. *Sagittaria arifolia* (L.) Link.  
 5. *Alisma plantago-foliosa* (L.) Rostk Schmidt  
 6. *Sparganium angustifolium* Michx.  
 7. *Najas* sp.  
 8. *Chara* sp.  
 9. *Utricularia* sp.  
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